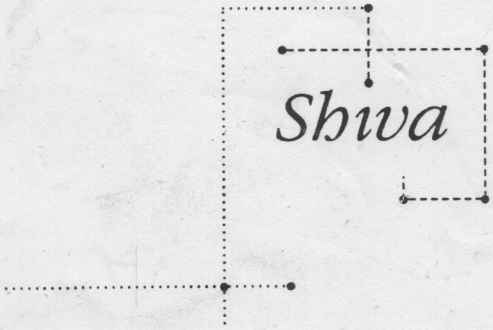
Shiva Corporation
155 Second Street
Cambridge, MA 02141



NetBridge

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Radio and Television Interference

Radio and Television Interference

The NetBridge generates and uses radio-frequency energy. If it is not installed and used properly, the NetBridge may cause interference with radio and television reception.

The NetBridge has been tested and complies with the limits for a Class B computing device in accordance with the specifications in Part 15, Subpart J of the FCC rules. These rules are designed to provide reasonable protection against radio-frequency interference in a residential installation. However, there is no guarantee that interference will not occur in a particular installation.

You can determine whether your NetBridge is causing interference by turning it off. If the interference stops, it was probably caused by the NetBridge.

If interference does occur, the following measures are suggested to correct the problem:

- Move the television or radio antenna.
- Move the NetBridge away from the radio or TV.
- Plug the NetBridge into a different electrical outlet.
- Talk to an experienced radio/TV technician for other suggestions.

You may also find helpful the following booklet, prepared by the FCC: "How to Identify and Resolve Radio-TV Interference Problems." This booklet is available from the U.S. Government Printing Office, Washington, DC 20402

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Introduction to NetBridge

What is a NetBridge?

The NetBridge is a simple, easy to install AppleTalk bridge that joins two networks. The addition of a NetBridge can make your AppleTalk internet more efficient, more reliable, and easier to use. NetBridge, can expand the power and use of your computer communications.

The NetBridge package also includes the Bridge Manager software, which brings unprecedented power and convenience to the tasks of examining, managing, and troubleshooting complex AppleTalk internetworks.

Glossary of Terms

Aging The process by which an internetwork "forgets" about networks that have gone away.

AppleTalk A set of protocols which specify how devices in an internet should communicate with each other. AppleTalk was originally confined to Macintosh computers and LocalTalk cabling, but has expanded to include support for many different kinds of computers and several different kinds of cabling.

Balanced Internet An internetwork which has been divided so that each of its networks contains approximately the same number of nodes.

Bridge An intelligent device which links networks together to form an internetwork. Bridges know how to send data to any node in the internet, but also isolate each network so that data is never sent unneccessarily.

Bridge device file A file which contains software for accessing a particular type of bridge. The Bridge Manager uses bridge device files to access new kinds of bridges.

Bridge Manager Software that comes with the NetBridge that allows you to examine, manage, and troubleshoot an internet.

Broadcast To send a packet of information to all of the nodes on a network.

Chooser A Macintosh Desk Accessory that is used to choose amongst network devices such as modems and printers.

EtherTalk A hardware and low-level software system that runs an AppleTalk network on Ethernet hardware.

Internal network A network which is internal to a NetBridge. The Bridge Manager communicates with the NetBridge through its internal network.

Internet Address The "address" by which a specific network service can be found. An internet address consists of a network number, a node ID, and a socket number.

Internetwork A collection of individual networks linked by bridges. Often shortened to "internet."

LocalTalk An AppleTalk network wiring scheme offered by Apple Computer. LocalTalk uses shielded twisted pair cabling.

Lookup A request that all network services of a given type respond with their name and internet address. For instance, a lookup may find all LaserWriters in the local zone.

Network A group of computers and other computer devices that communicate with one another over the same wire.

Network connector The interface between a network node and the network wire.

Network number The number by which an individual network is identified. The network number of its network makes up the first part of a network service's internet address.

Node A device that is connected to a network.

Node ID The number by which an individual node is identified. The node ID of its node makes up the second part of a network service's internet address.

Packet A chunk of data that is sent from one node to another

PhoneNET An AppleTalk network wiring scheme offered by Farallon Computing. PhoneNET uses your existing telephone wiring.

Port The connector through which a node attaches to a network connector.

Routing Table A table of information that each bridge maintains that tells it how to send a packet of data to any network in the internet.

Socket The number by which an individual service within a node is identified. The socket ID makes up the last part of a network service's internet address. There can be several sockets -- and therefore several network services -- within the same node.

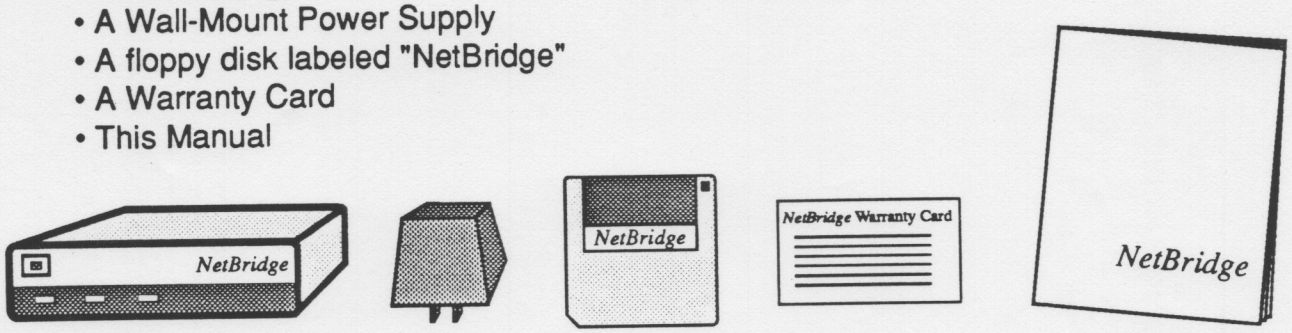
Zone A named group of networks. A zone can consist of networks that are not directly connected to each other. Zones are used to organize the networks in an internet.

Zone Access Privileges A feature of the NetBridge which allows you to restrict access from one zone to another.

What you have

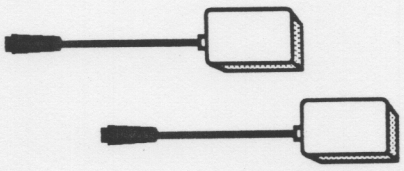
Your complete NetBridge package should contain the following items:

- The NetBridge
- A Wall-Mount Power Supply
- A floppy disk labeled "NetBridge"
- A Warranty Card
- This Manual



What you need

In addition to the items provided with your NetBridge, you will also need two "Mini 8" network connectors. These are the same connectors that you would use to hook a Mac II, Mac SE, or Mac Plus to your network.



- Apple LocalTalk connector kit part no. M2068
- Farallon PhoneNET part no. PN208

Introduction

The NetBridge is designed so that anyone can very quickly and easily set up a large internet. A single NetBridge always connects two separate networks. You can use the NetBridge to split an existing network into two separate networks, or to join two existing networks together.

Choosing a Location

The NetBridge should be placed in a well ventilated area away from direct sunlight. Do not locate the NetBridge near heating or cooling equipment.

To reduce the chances that your NetBridge will be inadvertently disconnected or powered off, it is usually a good idea to put the NetBridge somewhere that is not easily accessible.

Where should I split my network?

There are many strategies for organizing an internet. Often, an obvious division of your network will come to mind -- perhaps splitting along a physical boundary such as upstairs and downstairs, or an organizational boundary such as "Sales Department" and "Engineering Department." You should take advantage of such a division if one exists.

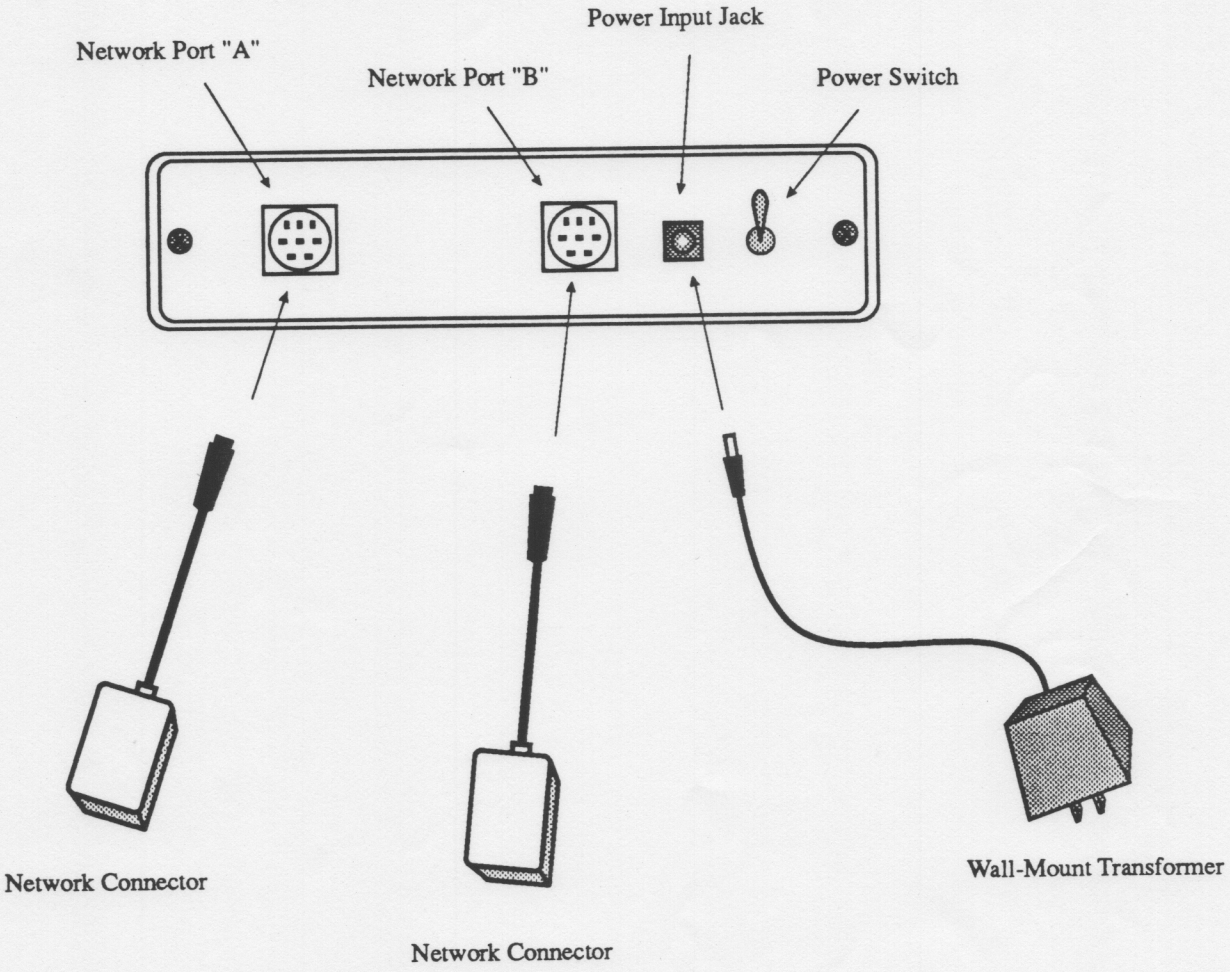
If, however, you lack an obvious place to split your network you will find that the "Balanced Internet" technique usually works quite well. A Balanced Internet has approximately the same number of nodes on each network. To create a Balanced Internet, simply split your network at a point so that approximately half of the nodes are on each side of the split. Remember that devices such as NetModems and LaserWriters, as well as Macintoshes, count as network nodes.

NetBridge connections

Plugging in a NetBridge is simple. Always make sure that the NetBridge's power is switched off before you make any connections. To provide power, connect the wall mount power adapter to the NetBridge's power input jack, then plug the power adapter into a 120 VAC outlet.

Always connect each of the NetBridge's ports to a network before switching on the its power!

When connecting networks to the NetBridge, you must make sure that each port is connected to a different network!



Splitting one network into two

1. Split the network at your chosen spot .

2. Add a network connector to the end of each network that you have created. If you are using PhoneNET, make sure that you insert a termination resistor where necessary.

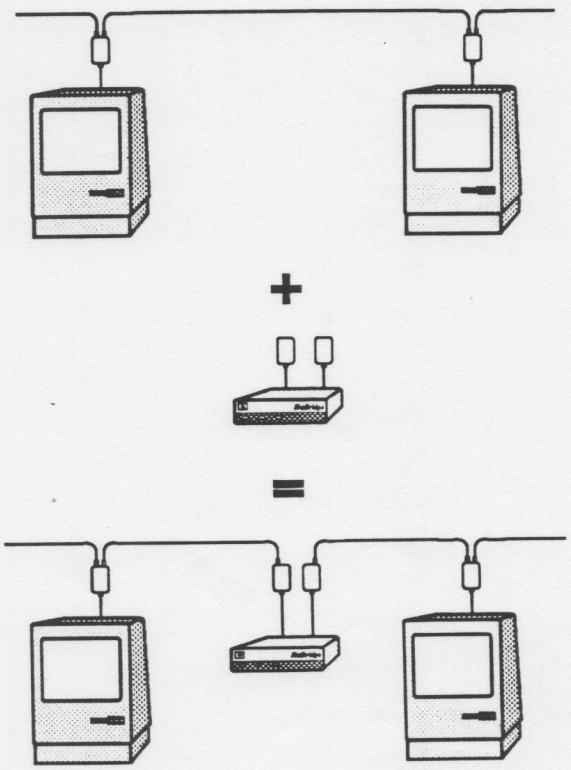
3. Plug one of the newly added network connectors into port A of the NetBridge and the other into port B. **Make sure that you don't plug the same network into both of the NetBridge's ports!**

4. Connect the cable from the power adapter to the NetBridge's power input jack.

5. After making sure the power switch is turned off (down), plug the power adapter into a 120 VAC wall outlet.

6. Switch on the NetBridge's power. The green light on the front panel indicates that the power is on. The red light on the front panel flashes very briefly as the NetBridge does its power-on self test, and then extinguish if no errors are detected.

7. Depending on the size of your internet, it can take several minutes before your entire internet has learned of the NetBridge's arrival.



Joining two networks

1. Insert a network connector in each network at the chosen spots.

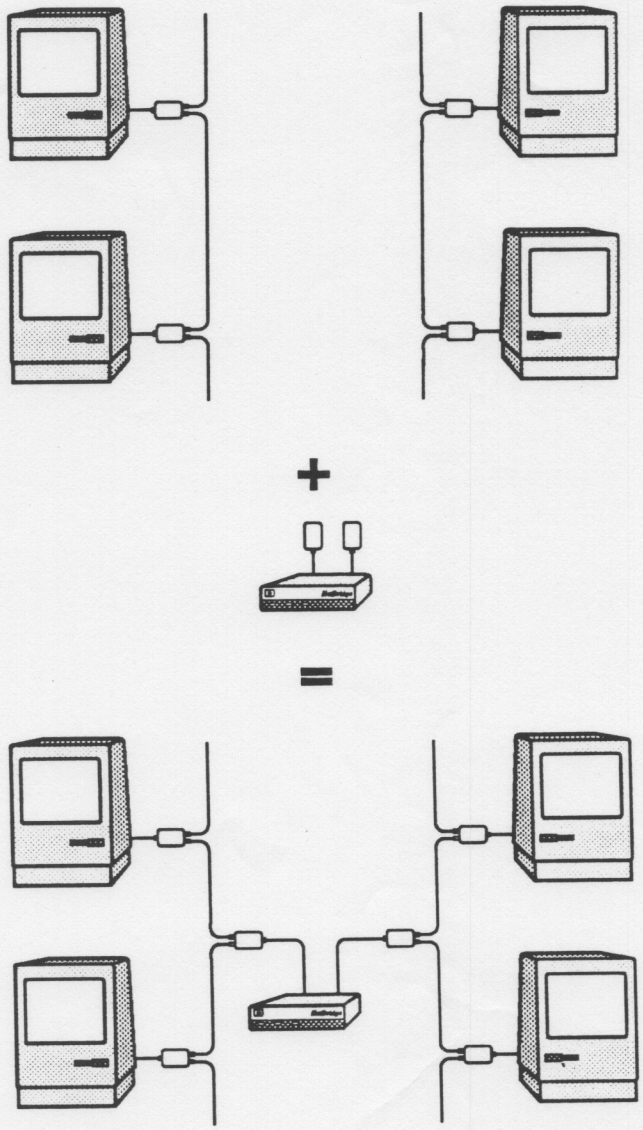
2. Plug one of the newly added network connectors into port A of the NetBridge and the other into port B. **Make sure that you don't plug the same network into both of the NetBridge's ports!**

3. Connect the cable from the power adapter to the NetBridge's power input jack.

4. After making sure the power switch is turned off (down), plug the power adapter into a 120 VAC wall outlet.

5. Switch on the NetBridge's power. The green light on the front panel indicates that the power is on. The red light on the front panel flashes very briefly as the NetBridge does its power-on self test, and then extinguish if no errors are detected.

6. Depending on the size of your internet, it can take several minutes before your entire internet has learned of the NetBridge's arrival.



What happens when I switch it on?

Before it does anything else, a NetBridge always tests itself to make sure everything appears to work. When its self-test is finished, the NetBridge begins listening on each of its ports to learn what it can about the internet to which it is attached.

If there are any other bridges on one of the NetBridge's networks, the NetBridge learns that network's network number and zone from another bridge. If there are no other bridges on that network, then the NetBridge assigns it a network number and zone.

Once the NetBridge has determined a network number and zone for both of its ports, it begins to periodically broadcast its knowledge to the other nodes on each of its networks. By doing so, it lets all the devices on a network know they can talk to devices on the other side of the NetBridge. Every ten seconds, the NetBridge broadcasts its most recent knowledge about the internet.

NetBridge defaults

If the NetBridge has to assign a network number and zone to a network (because there were no other bridges on that net), it gets both the zone name and the network number from values that it has stored in non-volatile memory. Those values are the same network numbers and zone names that were assigned to each of the NetBridge's ports when its power was last switched off.

When the NetBridge arrives from the factory, both of its ports are assigned to the same zone, so no zone will show up in the Zone Chooser. It will also have its default name, "NetBridge™", and no password. The Zone Access Protocol is inactive, allowing free access in both directions.

When a NetBridge first powers up after arriving from the factory, it assigns random network numbers to any networks that don't already have a bridge. Since network numbers are invisible to users of the network, you usually won't need to ever change the random assignments.

What is the Bridge Manager?

The Bridge Manager is a software program that you can use to examine, set up, manage, and troubleshoot an AppleTalk internetwork. The Bridge Manager allows you to create and delete zones, move networks from zone to zone, set zone access privileges, get status information, and change network numbers. In striking contrast to previous bridge configuration software, the Bridge Manager allows you to quickly and simply examine and configure your entire internet from one location.

One of the most important features of the Bridge Manager (and the reason it is not called the NetBridge Manager), is its ability to get information from and configure other manufacturer's bridges. The Bridge Manager uses special "bridge device files" to talk to different kinds of bridges. As new kinds of bridges are developed, making your copy of the Bridge Manager support them is a simple matter of dragging a new bridge device file into the Bridge Manager's folder.

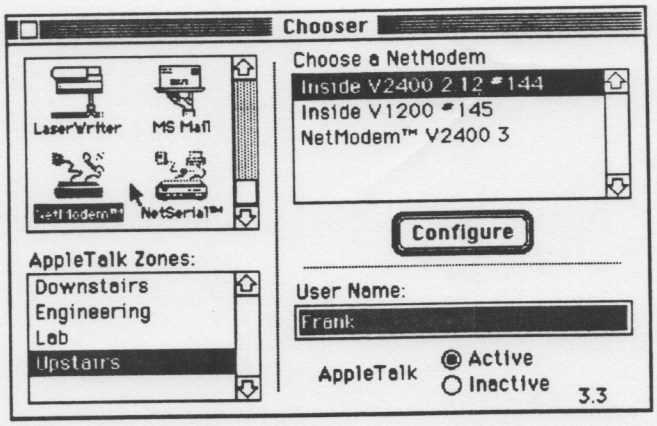
The Bridge Manager also has the ability to let you "see" your internet, showing you all of the individual workstations, LaserWriters, NetModems and and any other nodes in each network. In most cases, the Bridge Manager will serve as your primary internetwork management tool, even for tasks which are not specific to your NetBridge.

What can network management do for me?

It is true that the NetBridge is designed so that you can simply plug it in, turn it on, and start using it right away. In fact, if you have a simple internetwork, you may not ever need to use the Bridge Manager software. However, in many cases you will want to use the Bridge Manager to customize your internet for your own needs. In particular, you may want to divide your internet into two or more "zones", or named groups of networks.

The Chooser with zones

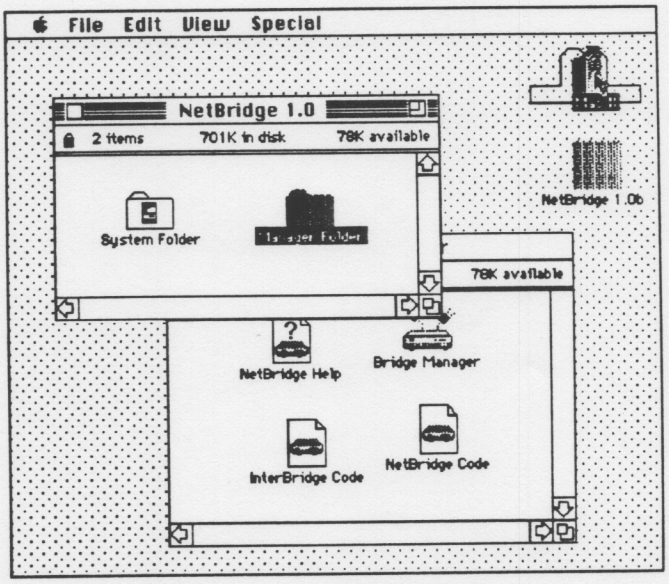
If there is more than one zone in your internetwork, the Chooser (and any other software which performs Chooser-like functions) shows you a list of zones in which to look for things. As your internet grows larger, you will probably find that dividing it into zones allows you to organize it more efficiently.



The Chooser shows a list of zones anytime there is more than one zone in your internetwork.

Installing the Bridge Manager on a disk

The Bridge Manager is not copy-protected or passworded in any way. To install it on a floppy disk or a hard disk, just copy the "Manager Folder" from the NetBridge Installation Disk to your destination disk. The Manager Folder contains the Bridge Manager application, its help files, and bridge device files for all of the bridge types which are currently supported by the Bridge Manager. All bridge device files and help files must be in the same folder as the Bridge Manager for it to find and use them.



Install the Bridge Manager application by dragging the "Manager Folder" to your destination disk.

How to avoid losing friends

Making changes with the Bridge Manager can play havoc with an active internet. Any user activity on a network that is changed is likely to be disrupted. If you add or change zones, or move networks from one zone to another, your users may also need to use the Chooser to reselect their NetModems, LaserWriters, file servers, mail servers, and other network services. Therefore, you should notify all users before making any changes, and make it clear that you don't recommend they use the network while your changes are in progress!

A note about security

Since making changes with the Bridge Manager can be so disruptive of an active network, **we recommend that you give each NetBridge a password!** The Bridge Manager will not allow you to make changes to a passworded NetBridge without first giving its password. Since the password is encrypted and stored in the NetBridge itself, NetBridge password security is quite difficult to circumvent.

We also strongly recommend against forgetting your password! There is no "factory override" that will allow you to recover from a lost password. **If you do lose its password, your NetBridge will have to be returned to Shiva for repair!**

Running the Bridge Manager

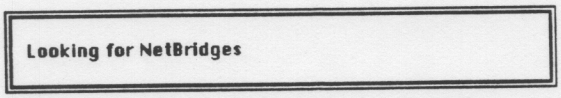
To get started managing your network, or just to have a look at how it is organized, start up the Bridge Manager application by double-clicking on its icon.

Run the Bridge Manager by double-clicking on its icon.

Bridge Manager

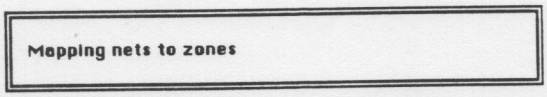
Before it can do anything else, the Bridge Manager investigates the entire internet to find any bridges that it can talk to and to determine the structure of the internet. The Bridge Manager begins its investigation by asking the nearest bridge for a list of all zones in the internet. It then searches each zone for bridges.

The Bridge Manager first searches the internet for bridges.



When it has found all of the bridges, the Bridge Manager asks one of them for a list of all networks in the internet, and matches each network to its corresponding zone.

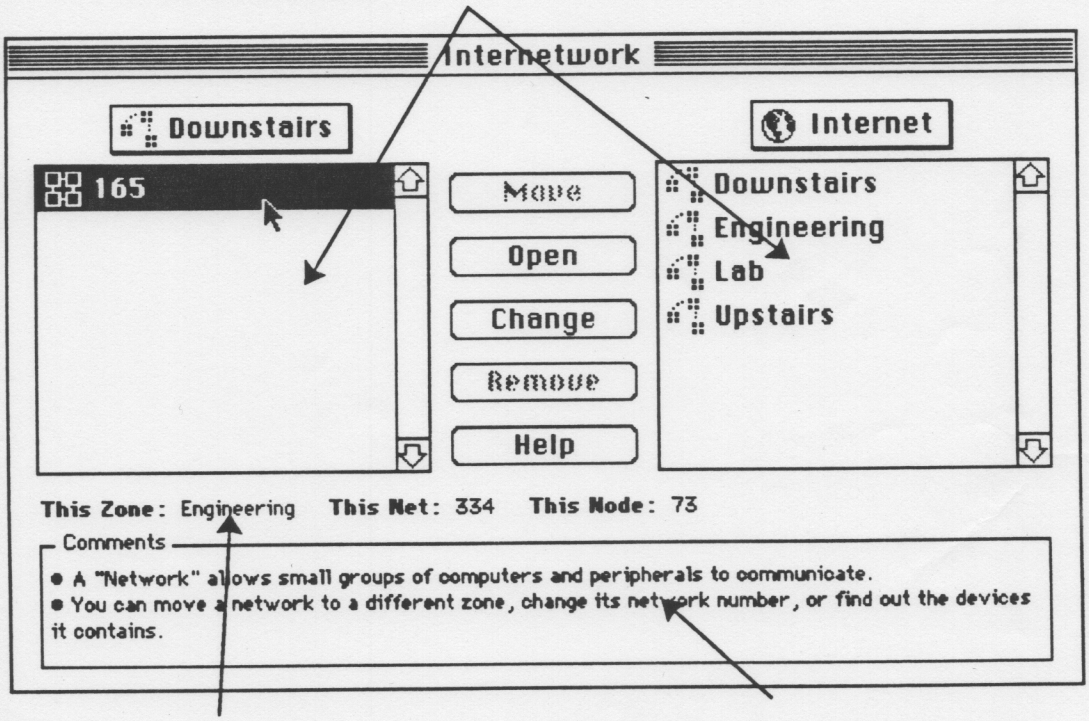
When the Bridge Manager has found all nets, it matches each with its zone.



The Internetwork window

After it has finished investigating the internetwork, the Bridge Manager displays the Internetwork window. The Internetwork window shows two independent views of the internetwork. Each view can show either a list of all zones in the internet, or a list of all networks in a specific zone. **Remember, the left and right lists in the Internetwork window are independent views of the same thing!**

You can have two different simultaneous views of the internet or its parts. Each side of the Internetwork window can show any view of the internetwork. Here, the left side shows all networks in the zone "Downstairs" and the right side shows all of the zones in the internet.



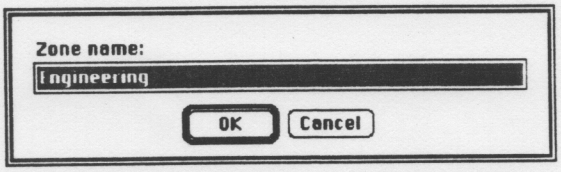
The Bridge Manager displays the zone, network, and node number of the workstation on which it is being run.

Context sensitive help "comments" are always available. Complete help can also be obtained with a click of the "Help" button.

Changing a zone

To change the name of a zone, make either the left or the right side of the Internetwork window show a list of zones, select the zone you wish to change and click the "Change" button.

Type a new zone name in this window.



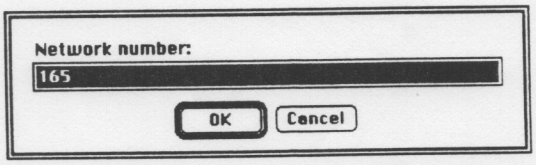
Opening a zone

To see a list of all the networks in a zone, select the zone you wish to see (in either the left or the right side of the window) and click the "Open" button, or double-click on the zone.

Changing a network number

To change a network's network number, first open the zone which contains that network, then select the network you wish to change and click the "Change" button.

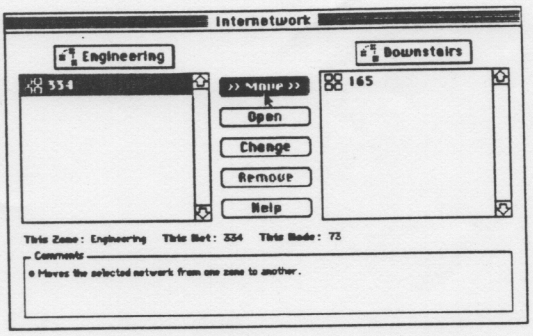
Type a new network number in this window.



Moving a network

To move a network from one zone to another, open the zone you wish to move it from on one side of the window and open the zone you wish to move it to on the other. Then select the network you wish to move and click the "Move" button.

Open two different zones to move networks between them.



Removing a zone

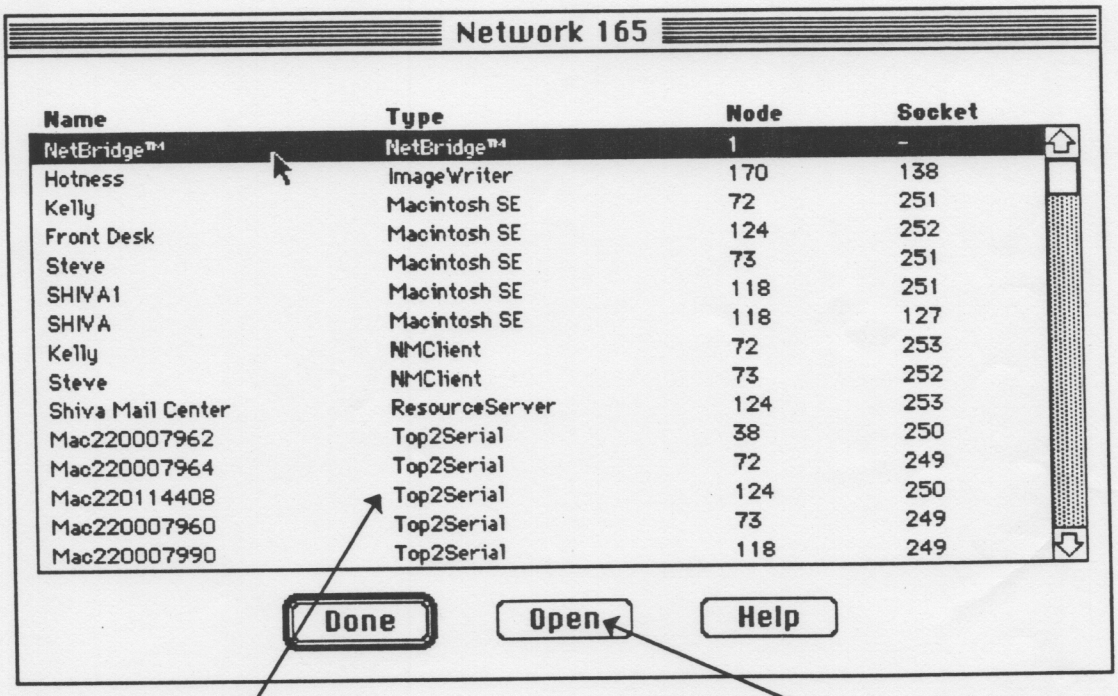
You can remove a zone which contains no networks by selecting it and then clicking the "Remove" button.

The Network window

To see a list of everything in a network, select the network you wish to see (in either the left or the right side of the window) and click the "Open" button, or double-click on the network. The Internetwork window will go away, to be replaced by the "Network" window, which shows every service (and there may be more than one per device) which is registered in the network you have chosen.

Device specific information

When you select a device about which the Bridge Manager can display additional information (such as a NetBridge), the "Open" button is active. Clicking the "Open" button, or double-clicking on the device opens up a window of information specific to that device.



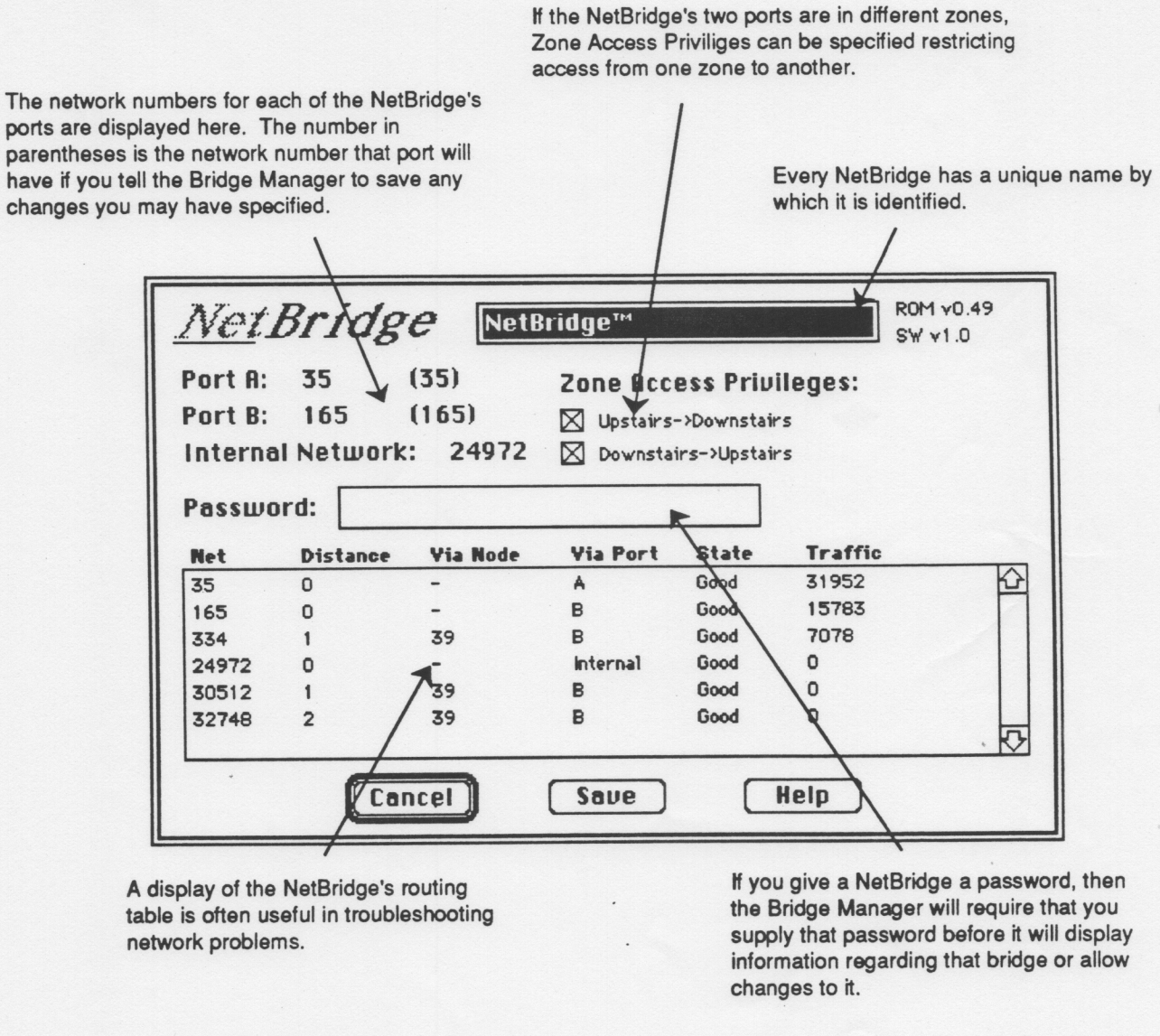
The Network window lists all of the registered services in a network.

The "Open" button is active when you select a device (a NetBridge, for instance) about which additional information can be displayed.

The NetBridge window

The NetBridge window contains additional information which is specific to the chosen NetBridge. In the NetBridge window, you can change the NetBridge's name, give it a password, or change its Zone Access Privileges.

Unlike changes in the Internetwork window, any changes you make in the NetBridge window take place immediately when you click the "Save" button.

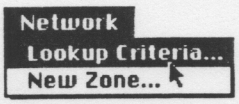

If the NetBridge's two ports are in different zones, Zone Access Priviliges can be specified restricting access from one zone to another.
The network numbers for each of the NetBridge's ports are displayed here. The number in parentheses is the network number that port will have if you tell the Bridge Manager to save any changes you may have specified.
Every NetBridge has a unique name by which it is identified.
NetBridge
NetBridge™
ROM v0.49
SW v1.0
Port A: 35 (35)
Port B: 165 (165)
Internal Network: 24972
Zone Access Privileges:
Upstairs->Downstairs
Downstairs->Upstairs
Password:
Net Distance Via Node Via Port State Traffic
35 0 - A Good 31952
165 0 - B Good 15783
334 1 39 B Good 7078
24972 0 - Internal Good 0
30512 1 39 B Good 0
32748 2 39 B Good 0
Cancel
Save
Help
A display of the NetBridge's routing table is often useful in troubleshooting network problems.
If you give a NetBridge a password, then the Bridge Manager will require that you supply that password before it will display information regarding that bridge or allow changes to it.

The "Lookup Criteria" menu choice

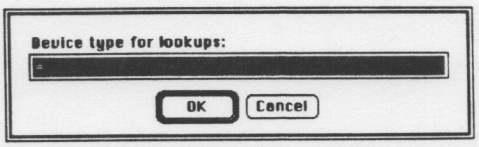
You can tell the Bridge Manager to only show devices of a certain type in the Network window. Pull down "Lookup Criteria" in the Network menu and then type in the device type you wish to see.

For instance, to find only NetModems, you should set the lookup device type to "NetModem™". Normally, you the device lookup type should be "=", which finds everything in a network.

Choose "Lookup Criteria" from the Network menu to set the network lookup criteria.



Put in the device type you wish to find, or "=" to find everything.

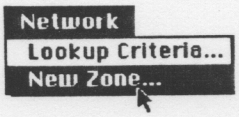


The "New Zone" menu choice

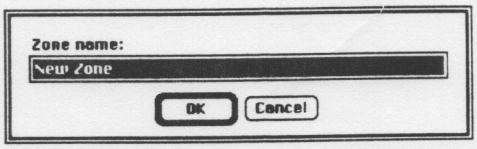
To create a new zone, pull down "New Zone" in the Network menu, then type in the name of the zone you wish to add.

Once you have created a zone, you need to move at least one network into it before it will really exist.

Choose "New Zone" from the Network menu to create a new zone.



Type in the name of the new zone.



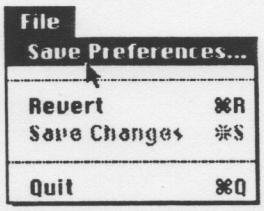
The "Save Preferences" menu choice

You can save your personal Bridge Manager preferences. Pull down "Save Preferences" in the File menu and set your preferences in the Manager Preferences window.

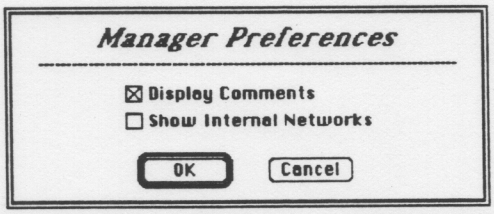
Unchecking "Display Comments" makes the context sensitive help "comments" go away.

Checking "Show Internal Networks" makes the Bridge Manager display NetBridge internal networks in the Internetwork window. Since the internal networks are invisible in normal internetwork use, we recommend that you do not show them during normal use of the Bridge Manager.

Choose "Save Preferences" from the File menu to set your Bridge Manager preferences.



You can choose whether you wish to see the Help "comments" and if you wish to see internal networks.

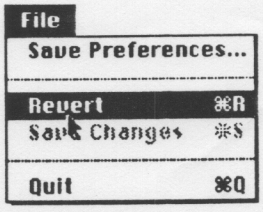


The "Revert" menu choice

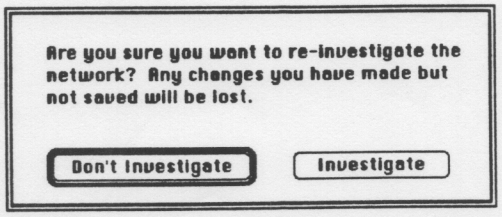
Pull down "Revert" in the File menu to make the Bridge Manager repeat its investigation of the internet and revert to the existing internet configuration.

Reverting throws out any changes that you have made and not saved. Therefore, if you have unsaved changes the Bridge Manager first confirms that you do indeed want to discard your changes before proceeding with the Revert command.

Choose "Revert" from the File menu to make the Bridge Manager repeat its investigation of the internet.



If you have unsaved changes, the Bridge Manager confirms that you wish to discard them.

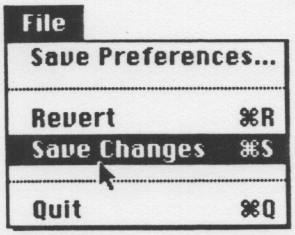

Are you sure you want to re-investigate the network? Any changes you have made but not saved will be lost.
Don't Investigate
Investigate

The "Save Changes" menu choice

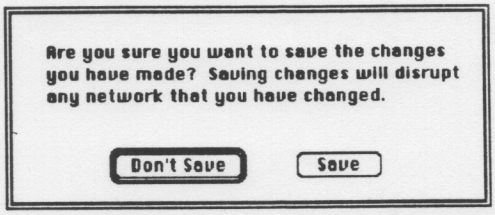
When you change zone names and network numbers, and when you move networks from zone to zone, the Bridge Manager does not actually make any changes to your internet until you specifically tell it to with the "Save Changes" menu choice.

When you are satisfied that you have made all the changes you want to, pull down "Save Changes" from the File menu. Since changing the internet is likely to disrupt its use, the Bridge Manager first confirms that you really want to save your changes before proceeding.

Choose "Save Changes" from the File menu to save any changes that you have made to your internet.



The Bridge Manager asks you to confirm that you really want to save changes.

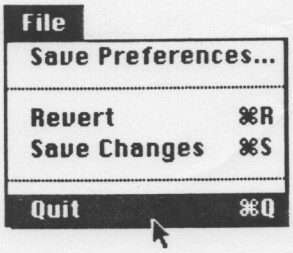

Are you sure you want to save the changes you have made? Saving changes will disrupt any network that you have changed.
Don't Save
Save

The "Quit" menu choice

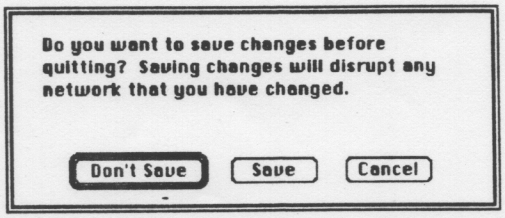
When you are done using the Bridge Manager, pull down "Quit" from the File menu.

If you have unsaved changes, the Bridge Manager will confirm that you really wish to quit without saving them. You can then either cancel the "Quit" choice, or tell the Bridge Manager to save changes and then quit.

Choose "Quit" from the File menu when you are done with the Bridge Manager.



If you have unsaved changes, the Bridge Manager will ask if you want to save them.


Do you want to save changes before quitting? Saving changes will disrupt any network that you have changed.
Don't Save
Save
Cancel

How does the Bridge Manager make changes?

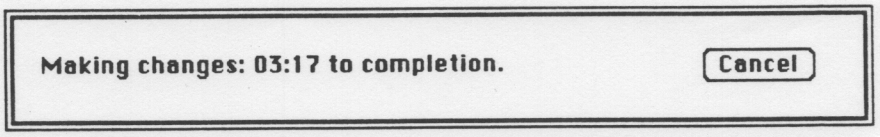
When you tell the Bridge Manager to save changes, it begins a multiple stage process of making changes. First it tells the bridges on every network that is being changed to "forget" about that network. Since those bridges stop telling all the other bridges about that network, eventually the entire internet will "forget" about that network.

When the whole internet has forgetten about a network, the Bridge Manager then tells the bridges on that network to change its zone and network number, and then to "remember" it again. Since those bridges start telling other bridges about the network (but with all new information), eventually the whole internet relearns about that network.

Even though the Bridge Manager makes all of its changes simultaneously, the whole process of first "forgetting" about a network and then relearning about it can take quite a while. The exact length of time depends the size of your internet and on whether the Bridge Manager has to change the internal network of any NetBridges, which takes place after all other changes have been made.

For a medium sized internet, changes will generally take anywhere from 3-8 minutes. In the special case of an internet with only one bridge, changes can be saved in just a few seconds.

The Bridge Manager keeps track of the time remaining as your changes are saved.



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